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REMARKS

Following entry of the above amendments, claims 2-4, 6, 7, and 9-24 will be pending. Claims 1, 5, and 8 have been canceled without disclaimer. Claims 2 and 9 have been re-written in independent form, and have been amended both for clarification, and to more clearly define over the prior art. Claims 3, 4, 6, and 7 have been amended to conform to the changes in claim 2, with claim 4 also amended to depend upon claim 6, and to incorporate a feature of canceled claim 5. Claims 10-22 have been amended to correspond to the changes in claim 9. In addition, claim 10 was amended to change "comprising" to "consisting essentially of," minor changes were made to claims 13 and 14, and claim 18 was amended to recite an additional feature. Further, the dependencies of all the amended dependent claims have also been re-numbered in accordance with the Examiner's comments on page 2 of the Office Action. Claims 23 and 24 have been added.

The specification has been amended to correct a pair of typographical errors.

Numbering of Claims

As noted above, the dependencies of the dependent claims have been amended to conform to the re-numbering of claims done by the Examiner.

Prior Art Rejections

The various prior art rejections are addressed individually below. In general, however, it is observed that the references refer principally to fluxes that are used in refining steel. The claims have been amended to more clearly reflect the inventive product and its use, a cleaning additive used in cleaning refractory surfaces of furnaces and other vessels. The claims have also been amended to specify that the cleaning additive is substantially free of fluorspar (also known as calcium fluoride or CaF_2), an important aspect of the claimed additive.

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Kemeny

Claims 18-20 stand rejected under 35 USC 102(b) as anticipated by Kemeny et al., U.S. Patent No. 5,279,639 ("Kemeny"). Claims 2, 3, 7, 9, 10, 12, 21, and 22 stand rejected under 35 USC 103(a) as obvious over Kemeny. Withdrawal of the rejections is respectfully requested for at least the following reasons.

Kemeny describes a composition for treating ladle slags in steel refining. Kemeny describes broad ranges of several possible components of compositions. Col. 7, lines 25-45. However, there are two components of Kemeny's composition that Kemeny recognizes as being of special importance: 1) calcium carbide, and 2) various carbonates. Col. 6, lines 38-45. According to Kemeny, the function of the carbonates is to release carbon dioxide gas when added as part of a slag system. Col. 6, lines 48-61. The function of the calcium carbide, its "novel use," according to Kemeny, is that it is a powerful reductant, and that any excess in the calcium carbonate reacts with the carbon dioxide gas produced by the carbonates. Col. 6, line 62 – col. 7, line 25. Calcium fluoride (fluorspar) is listed in multiple places in Kemeny among the other possible components of Kemeny's additive. Col. 4, lines 66-67; col. 5, lines 21-23; col. 6, line 25; col. 7, lines 31-67; col. 10, line 60 – col. 11, line 2. Kemeny discloses that fluorspar is useful as a flux. Col. 5, lines 21-23. Kemeny's preferred component range for its composition lists calcium fluoride, albeit with zero as the bottom of the range. Kemeny does not disclose any sort of problem with use of fluorspar in an additive, and indeed indicates that its addition is advantageous. In addition, Kemeny does not disclose a cleaning additive for iron production, or use of such a cleaning additive.

Claim 2 as amended recites a cleaning additive for cleaning furnace walls and inductor loops by fluxing and fluidizing build-up in molten iron, wherein the additive is fluorspar free and includes specified ranges of five components, and wherein in use the additive removes and coalesces emulsified slag particles, and softens build-up on furnace sidewalls and inductor throats, without attack on furnace refractory, as occurs

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with fluorspar fluxing additives. Kemeny does not teach or suggest a cleaning additive for treating molten iron, but rather a steel refining additive. The problems of iron production and steel problems are different from one another. Steels are normally melted in large arc furnaces. Cast irons can be melted in cupolas (coke fired shaft furnaces) and electric furnaces would include coreless induction and channel furnaces. Pressure pour furnaces are metal holding furnaces, positioned above a sand molding line, and these furnaces are briefly pressurized for the sole purpose of pouring metal into the sand molds. The differences in the processes are great enough that one encountering Kemeny would not be motivated to use its steel refining additive as a cleaning additive in iron production, if indeed Kemeny's additive would even function as a cleaning additive. And although Kemeny does not absolutely require fluorspar in its additive, it does list fluorspar (calcium fluoride) as part of its preferred materials, and does not provide any teaching regarding the undesirability of fluorspar. Despite Kemeny's disclosure of very broad ranges of materials, none of Kemeny's actual embodiments are fluorspar-free additives with materials in the recited ranges. Kemeny simply does not teach or suggest fluorspar-free materials as recited in claim 2. Therefore claims 2, 3, and 7 are patentable over Kemeny.

Claim 9 recites a method of treating molten iron, wherein the method includes, *inter alia*, adding the cleaning additive recited in claim 2 to remove and coalesce emulsified slag particles, and soften build-up on refractory of the furnace or treatment vessel. In addition to the failure of Kemeny to teach or suggest the recited cleaning additive (discussed above), Kemeny does not teach or suggest using such an additive in treating molten iron. As noted above, steel refinement and iron production are different operations, and Kemeny addresses only steel refinement. Further, Kemeny provides no teaching or suggestion of achieving the recited results by adding the recited additive. Without any teaching or suggestion for obtaining the results, or even that attaining such results is desirable, there is no reason for one skilled in the art to be

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motivated by Kemeny to perform the recited method. Thus claims 9, 10, 12, and 18-22 are patentable over Kemeny.

Dependent claim 10 specifies that the cleaning additive consists essentially of narrower ranges of the recited materials. It will be appreciated that the transitional phrase used limits claim 10 to the recited materials and those that do not materially affect the basic and novel characteristics of the claimed invention. MPEP 2111.03. Kemeny clearly has additional materials that affect its characteristics, and according to Kemeny provide the basic novelty of Kemeny's material. Thus Kemeny does not teach or suggest the additive consisting essentially of the materials recited in claim 10, and therefore claim 10 is patentable over Kemeny for another reason.

Combination of Kemeny and Threlkeld

Claims 4, 5, and 11 stand rejected under 35 USC 103(a) as obvious over Kemeny in view of Threlkeld, U.S. Patent No. 2,862,809 ("Threlkeld"). Threlkeld does not make up for the failure of Kemeny to teach or suggest the features of claims 2 and 9, as was discussed above. Therefore claims 4, 5, and 11 are patentable over Kemeny and Threlkeld, either alone or in combination.

Combination of Kemeny and Graf

Claim 13 stands rejected under 35 USC 103(a) as obvious over Kemeny in view of Graf, U.S. Patent No. 2,760,859 ("Graf"). Graf does not make up for the failure of Kemeny to teach or suggest the features of claim 9, as was discussed above. Therefore claim 9 is patentable over Kemeny and Graf, either alone or in combination.

Rejections Involving Combinations of Dvorak and Mrdienovich

Claim 14 stands rejected under 35 USC 103(a) as obvious over Dvorak et al., U.S. Patent No. 3,721,547 ("Dvorak") in view of Mrdjenovich, U.S. Patent No. 4,137,071

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("Mrdjenovich"). Claims 15 and 16 stand rejected as obvious over Dvorak in view of Mrdjenovich, further in view of ASM Metals Handbook. Claim 17 stands rejected as obvious in view Dvorak and Mrdjenovich, further in view of Shimada et al., U.S. Patent No. 5,559,827.

Claims 14-19 have been amended to depend upon claim 9, rendering moot the above rejections. (Claims 14-19 formerly depended upon canceled claim 8, which was rejected as obvious over Dvorak and Mrdjenovich. Since this combination was not used in a rejection of claim 9, it is assumed that claim 9 is considered patentable over Dvorak and Mrdjenovich.)

Newly-Added Claims

Newly-added claim 23 is patentable for at least the reasons given above for the patentability of claim 2, upon which it depends. In addition, it is believed that claim 23 is patentable over Kemeny for the additional reason that Kemeny does not teach or suggest use of a complex aluminosilicate as is recited in claim 23.

Claim 24 is similar to claim 2, except that claim 24 uses the transitional phrase "consisting essentially of," rather than the phrase "comprising," which is used in claim 2. Thus claim 24 is narrower in scope than claim 2. The impact of the transitional phrase of claim 24 in distinguishing Kemeny is discussed above with regard to claim 10.

Conclusion

For at least the foregoing reasons, withdrawal of the rejections of the claims is respectfully requested, in which event this application would be in condition for allowance. Should the Examiner believe that a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

No fee is believed to be due with the filing of this paper. In the event any fees

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are due in connection with the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account No. 18-0988 (Charge No. NAROP0335US).

Respectfully submitted,

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